

## Report of tornadoes for the month of January, 1887.

Place.	Date.	Time.	Direction.	Form of cloud.	Number of persons killed.	Number of persons wounded.	Width of path.	Number and kind of animals killed.	Number and kind of buildings destroyed.	Total valuation of property destroyed.	Authority.
Sims Chapel, Alabama .....	13	A. M.....	ne.	Funnel.....	.....	.....	Feet, 1,320	Great loss of stock.	Many thousands of dollars.	Saint Louis: "Globe-Democrat."	
Chapel Hill, Tennessee.....	13	6 p. m.....	ne.	Funnel None.....	Several	.....	1,320	Many .....	Many .....	E. D. Thompson, Marshall county, and C. Foster Williams, Ashwood, Tennessee.	
Near Greenbrier, Tennessee.....	13	6 p. m.....	Easterly	Funnel.....	.....	.....	1,320 to 2,640	.....	Many .....	Martin Walter, Cross Plains, Tennessee.	
Brookston, Texas.....	22	7 p. m.....	ne.	Funnel.....	.....	.....	.....	One church, several houses, number of barns.	Many thousands of dollars.	Saint Louis: "Globe Democrat."	
Near Brazos, and three miles west of Millesap, Texas.	22	About 4 a. m.....	ne.	Funnel None.....	None	.....	2,640	Very destructive.....	.....	H. M. Harrison, Millsap, Texas.	
Anderson's Mills, South Carolina.....	23	Afternoon	Easterly	Funnel.....	.....	.....	.....	Very destructive.....	.....	Goo. E. Ladsham, Pacolet, South Carolina.	
Near Fairview, South Carolina.....	23	Afternoon	Easterly	.....	.....	.....	.....	Very destructive.....	.....	Goo. E. Ladsham, Pacolet, South Carolina.	
Graham and Company shops, North Carolina.	24	A. M.....	Easterly	.....	None	None	1,320	None.....	Many .....	A. T. Smith, Altemahaw, North Carolina.	
Four miles south of Catawba, North Carolina.	25	4 a. m.....	e. ne.	.....	None	None	600	None.....	Very destructive to timber	G. C. McNeill, Catawba, North Carolina.	
Pultneyville, New York .....	30	5 p. m.....	ne.	Funnel None.....	None	.....	600	None.....	Cloud mostly on Lake Ontario.	M. A. Veeder, Lyons, New York.	
Twenty miles west of East Otto, New York.	30	4.20 p. m.....	ne.	Column of smk.	.....	.....	Narrow .....	.....	.....	Orrville L. Larkin, East Otto, New York.	
Burnt Factory, South Carolina.....	30	9 p. m.....	ne.	.....	None	None	Narrow .....	Many farm buildings.	.....	F. C. Sexton, Burnt Factory, South Carolina.	

## TEMPERATURE OF WATER.

The following table shows the highest and lowest temperatures of water observed at the several stations; the monthly ranges of water temperature; the average depth at which the observations were made; and the mean temperature of the air:

Temperature of water for January, 1887.

Station.	Temperature at bottom.		Range.	Average depth, feet and tenths.	Mean temperature of the air at station.
	Max.	Min.			
Alpena, Michigan a.....	0	0	0	.....	0
Augusta, Georgia.....	49.2	36.2	13.0	7.7	41.8
Baltimore, Maryland b.....	36.3	32.3	4.0	12.0	32.4
Boston, Massachusetts.....	34.5	29.2	5.3	23.9	25.9
Buffalo, New York a.....	.....	.....	.....	.....	.....
Candy Fort, Washington Territory.....	45.2	43.0	2.2	15.7	44.9
Cedar Keys, Florida.....	62.5	40.1	16.4	7.5	50.3
Charleston, South Carolina.....	52.9	42.7	10.2	36.4	45.6
Chicago, Illinois.....	33.0	32.5	0.5	8.8	17.3
Chincoteague, Virginia d.....	44.0	30.0	14.0	2.6	35.2
Cleveland, Ohio e.....	34.5	31.2	2.3	13.0	24.9
Detroit, Michigan a.....	.....	.....	.....	.....	.....
Duluth, Minnesota u.....	.....	.....	.....	.....	.....
Eastport, Maine.....	40.0	36.1	3.9	15.5	20.5
Escanaba, Michigan.....	.....	.....	.....	.....	.....
Galveston, Texas.....	57.6	39.4	18.2	13.6	51.2
Grand Haven, Michigan f.....	32.4	32.2	0.2	18.0	20.1
Jacksonville, Florida.....	59.1	47.6	11.5	18.0	49.8
Key West, Florida.....	74.7	60.4	14.3	18.3	66.5
Mackinaw City, Michigan a.....	.....	.....	.....	.....	.....
Marquette, Michigan a.....	.....	.....	.....	.....	.....
Mobile, Alabama.....	47.5	36.1	11.4	15.3	47.6
New London, Connecticut g.....	43.1	34.5	8.6	11.2	28.6
New York City.....	35.0	30.7	4.3	14.7	30.1
Norfolk, Virginia.....	43.1	33.4	9.7	15.4	39.4
Pensacola, Florida.....	57.3	45.5	11.8	17.0	49.1
Portland, Maine.....	33.5	30.0	3.5	17.0	18.7
Portland, Oregon.....	47.5	41.2	6.3	56.9	42.8
Sandusky, Ohio a.....	.....	.....	.....	.....	.....
San Francisco, California.....	52.7	50.7	2.0	37.1	51.8
Savannah, Georgia.....	51.0	39.4	11.6	9.8	46.3
Toledo, Ohio h.....	34.4	32.4	2.0	15.8	21.9

a Frozen throughout the month.

b Frozen 4th, 9th, 10th, 19th, 20th.

c Frozen from 1st to 26th, 30th, 31st.

d Frozen 3d, 4th, 5th.

e Frozen from 1st to 24th.

f Frozen from 1st to 22d, and 31st.

g Frozen 4th, 5th.

h Frozen from the 1st to 23d.

## INLAND NAVIGATION.

## STATE OF WATER IN RIVERS AND HARBORS.

The Mississippi River at Cairo, Illinois, was frozen over from the 1st to the 19th, the ice being of sufficient firmness as to allow heavy wagons to cross; on the 3d a channel was cut through the ice from Bird's Point, Missouri, to Cairo, to be used by the railroad transfer boats. An ice gorge formed at Bird's Point, Missouri, on the 7th and broke on the 20th, the

heavy ice passing out rapidly but doing no damage, as upon the first indications of the movement all river craft moved into safe quarters at the mouth of the Ohio River. On the 21st river men reported the Mississippi River clear of ice from Cairo, to Grand Tower, Illinois. On the 22d an ice gorge which had formed at Fountain Bluff, Illinois, five miles above Grand Tower, broke, but did no damage to the numerous boats and barges in winter quarters at the latter place. The river rose steadily on the 24th, 25th, and 26th, and was filled with heavy floating ice, but on the 27th it was sufficiently clear to allow navigation between Cairo, Illinois, and Saint Louis, Missouri, to be resumed. At La Crosse, Wisconsin, Dubuque, Davenport, and Keokuk, Iowa, and intervening points, the river was frozen solid throughout the month. At Saint Louis, Missouri, on the 1st, heavy floating ice gorged south of the bridge which crosses the river at this city, and remained so until the 24th, when it broke, and the ice began moving down. On the 25th the river was free of ice at this place. On the 27th a heavy gorge that had formed above the bridge broke, being forced down by ice from above. On the 28th, 29th, 30th, and 31st heavy ice passed down, filling the river from bank to bank, but steamboat navigation was generally being resumed.

On the 2d heavy floating ice in the Ohio River rendered navigation between Cairo and northern points impossible; the river continued in the same state until the 14th, when the ice became so soft as to offer but little impediment to navigation. On the 15th the river between Cairo and Paducah, Kentucky, was comparatively free of ice, but above that point heavy ice was reported as filling the river from bank to bank. On the 21st the steamer "Guiding Star" arrived at Cairo from Cincinnati. The captain reported the ice as very heavy north of Evansville, Indiana, and that he experienced great difficulty in getting through. The voluntary observer at Portsmouth, Ohio, reports heavy flowing ice in the Ohio River from the 2d to 13th, and from the 18th to 24th, during which time navigation was practically closed at that point. At Louisville, Kentucky, the river was filled with floating ice on the 2d and 3d, rendering navigation difficult; from the 4th to 9th it was entirely suspended owing to the heavy drift ice. From the 10th to 19th navigation was partially suspended; from the 20th to the end of the month the river was tolerably clear of ice.

The Alleghany and Monongahela rivers at Pittsburg, Pennsylvania, were filled with floating ice from the 1st to 15th, and from the 17th to 29th. On the 19th and 20th two heavy ice gorges, each nearly two miles long, formed in the Monongahela

River, between Monongahela City and Elizabeth, causing the river to rise rapidly and threatening to inundate the surrounding country. On the 23d and 24th a heavy ice gorge in the Alleghany River broke away and did considerable damage to boats tied up at Pittsburg and other places. Three barges were carried away from the landing at Freeport, and a number of rafts, boats, and barges, between that point and the 43d street bridge, were destroyed. The water in the river at Pittsburg reached its highest point on the 25th, when it was 16.1 feet above the low-water mark on the gauge.

Baltimore, Maryland: ice began forming rapidly in the harbor on the 3d; on the 4th it presented a serious obstacle to navigation, the harbor being covered with ice two to five inches in thickness. The same difficulty was experienced throughout the month, keeping ice boats busy breaking the ice.

Lynchburg, Virginia: the James River was frozen over at this point from the 3d to 25th.

Rochester, New York: the ice in the Genesee River broke up on the morning of the 24th and began flowing into the lake, doing no damage.

Milwaukee, Wisconsin: navigation between this point and east shore ports, by regular line steamers, was frequently interrupted during the month by heavy ice in the lake.

Leavenworth, Kansas: the Missouri River was frozen over at this point from the 1st to 31st; numerous reports from stations on the Missouri River, north of Leavenworth, show that the river was frozen over throughout the month.

In the following table are shown the danger-points at the various river stations; the highest and lowest depths for January, 1887, with the dates of occurrence, and the monthly ranges:

*Heights of rivers above low-water mark, January, 1887.*

[Expressed in feet and tenths]

Stations.	Danger point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River:</i>						
Shreveport, Louisiana.....	29.9	30, 31	5.1	22, 23	1.8	3.3
<i>Arkansas River:</i>						
Fort Smith, Arkansas.....	22.0	29	2.0	17	0.6	1.4
Little Rock, Arkansas.....	23.0	25	3.9	19, 20, 21	1.1	2.8
<i>Missouri River:</i>						
Yankton, Dakota.....	24.0					
Omaha, Nebraska a.....	18.0					
Leavenworth, Kansas a.....	20.0					
<i>Mississippi River:</i>						
Saint Paul, Minnesota a.....	14.5					
La Crosse, Wisconsin.....	24.0					
Dubuque, Iowa a.....	16.0					
Davenport, Iowa a.....	15.0					
Keokuk, Iowa a.....	14.0					
Saint Louis, Missouri.....	32.0	26	11.0	31	6.8	4.2
Cairo, Illinois.....	40.0	31	32.6	17	10.9	21.7
Memphis, Tennessee.....	34.0	31	22.6	19, 20	7.6	15.0
Vicksburg, Mississippi.....	41.0	5, 6	17.0	22, 23	8.0	9.3
New Orleans, Louisiana.....	13.0	7	4.7	24, 26	2.3	2.4
<i>Ohio River:</i>						
Pittsburg, Pennsylvania.....	22.0	25	16.1	10 to 14	2.8	13.3
Cincinnati, Ohio.....	50.0	30	43.0	16	11.5	31.5
Louisville, Kentucky.....	25.0	31	20.2	20	5.8	14.4
<i>Cumberland River:</i>						
Nashville, Tennessee.....	40.0	30	36.9	13	6.4	30.5
<i>Tennessee River:</i>						
Knoxville, Tennessee.....	25	13.4	23		2.7	10.7
Chattanooga, Tennessee.....	33.0	26	21.8	13, 14	5.0	16.8
<i>Monongahela River:</i>						
Pittsburg, Pennsylvania.....	29.0	25	16.1	11 to 14	2.8	13.3
<i>Savannah River:</i>						
Augusta, Georgia.....	32.0	26	11.3	21, 22, 23	6.5	4.8
<i>Mobile River:</i>						
Mobile, Alabama.....		7	16.9	1	13.8	3.1
<i>Sacramento River:</i>						
Red Bluff, California.....	21	6.2	10 to 14		1.0	5.2
Sacramento, California.....	23	13.2	13 to 16		9.0	4.2
<i>Willamette River:</i>						
Portland, Oregon.....	31	14.7	10, 11		4.5	10.2
<i>Colorado River:</i>						
Yuma, Arizona.....						

\* Frozen throughout the month.

FLOODS.

Port Deposit, Cecil county, Maryland: during the latter part of the month the heavy ice in the Susquehanna River became badly gorged in the neighborhood of this place, causing a rapid rise in the river at points above the gorge. On the 28th a large number of houses in the lower end of the town

was submerged; the houses were also injured by floating ice, lumber, and other débris. On the above date the river was free of ice from the Philadelphia, Wilmington, and Baltimore Railroad bridge to the Chesapeake Bay, between this bridge and the Baltimore and Ohio Railroad bridge the ice was solid, and eight inches thick; above the latter bridge the ice for a distance of ten miles was gorged. At McCall's Ferry, thirty-eight miles above Port Deposit, the ice was gorged for a distance of four miles. On the 29th heavy rain fell all day and the water in the river continued to rise, the main street of Port Deposit became flooded to a depth of four feet, and all communication by railroad was entirely cut off. Several unsuccessful attempts were made to break up the gorge by the use of dynamite. On the 27th and 28th travel at all points on the Delaware, Lackawanna, and Western Railroad between Wilkesbarre and Kingston, Pennsylvania, was suspended on account of the high water, which covered the track in some places to a depth of three feet. On the 30th a large gorge formed at Port Griffith, near Wilkesbarre, causing the river to overflow its banks and submerge all the low land in the vicinity; in some places the water rose to the second story of small houses located on the river bank. At the end of the month the river was still gorged with ice at numerous points.

Reading, Pennsylvania: on account of heavy rains all small streams in the vicinity of the Schuylkill River were much swollen on the 24th. A large ice gorge formed near Shoemakersville, above Reading, causing the river to overflow the surrounding country.

Mifflintown, Juniata county, Pennsylvania: on the 24th and 25th high temperature and heavy rain prevailed, melting the snow that covered the ground and causing the Juniata River to rise rapidly. On the morning of the 25th the ice in the river began moving; during the day a gorge formed below the town, causing the river to overflow its banks and carry away miles of fencing and numerous out-buildings.

Port Jervis, Orange county, New York: on the night of the 24-25th the ice in the Lackawaxen Creek broke up, but gorged at Hawley, Wayne county, Pennsylvania, submerging the lower part of the town. On the 25th the ice in the Delaware River gorged at Rosetown, three miles below this place, and flooded a large area of farming country, in some places to a depth of four feet.

Canaanoharie, Montgomery county, New York: on the 23d and 24th the ice in the Mohawk River and its tributaries began breaking up and floating down the river, gorging in numerous places against bridges or other obstructions. On the 24th large masses of ice were heaped against the West Shore Railroad bridge at this place, causing the river to overflow its banks and flood large areas of farming land.

Buffalo, New York: on the 23d light rain, with heavy wind and high temperature, prevailed, breaking up the ice in the Buffalo River, and flooding the lower parts of the city. During the night of the 23d-24th the river overflowed its banks, submerging about three thousand acres of land and doing considerable damage by flooding cellars and floating away fences and small frame buildings.

Toledo, Ohio: warm weather and light rain prevailed during 22d and 23d; this, in addition to a high southerly wind on the early morning of the 23d, caused the ice in the Maumee River to break up rapidly. During the afternoon a gorge formed in the river one mile below this point and the water began rising rapidly, flooding the lower part of the city. The trestle work of the Union railroad bridge was carried away by the ice on the afternoon of the 23d; on the 24th the Pennsylvania railroad bridge was damaged in the same way. On the 25th the river was clear of ice and the flood had subsided.

Wabash, Indiana: owing to the comparatively high temperature and heavy rains which prevailed on the 22d and 23d the ice in the upper part of the Wabash River broke up and began moving on the night of the 23d-24th. Small gorges formed in the river at numerous places, causing floods which did considerable damage; in Wells county several costly bridges were

Table of miscellaneous meteorological data for January, 1887—Signal Service observations.

Stations.	Elevation above sea-level.	Atmospheric pressure (in inches and hundredths).						Temperature of the air (in degrees Fahrenheit).						Winds.						Wind.																	
		Mean actual barometer.			Departure from normal.			Extremes.			Monthly mean.			Extremes.			Daily ranges.			Mean rel. humidity.			Departure from normal.			Wind.											
		Mean reduced barometer.	Departure from normal.	Highest barometer	Date.	Lowest barometer	Date.	Extremes.	Mean.	Max.	Date.	Extremes.	Mean.	Max.	Date.	Extremes.	Mean.	Min.	Date.	Mean min.	Max.	Date.	Mean.	Min.	Date.	Mean dew-point.	Precipitation.	Total movement.	Prevailing direction.	Miles p.h. <sup>2</sup>	Direction.	Maximum velocity.	No. of rainy days.	No. of cloudy days.	No. of clear days.		
New England.																																					
Eastport.	29.89	—.09	29.97	30.68	4	29.19	24	1.46	20.5	+ 1.5	50.3	1	31.0	—13.4	19	9.9	63.7	44.3	18	5.8	16	79.9	14.9	7.78	+ 4.03	\$8,481	N.W.	55	No.	14	21	12	14	5			
Portland.	29.85	—.09	29.97	30.68	4	29.19	24	1.46	18.7	+ 4.5	47.2	23	26.9	—14.7	19	9.3	61.9	34.6	28	3.8	13	82.9	14.0	3.80	+ 0.50	6,113	S.E.	32	D.	14	15	11	15	6			
Mount Washington.	27.23	—.32	29.91	30.75	4	29.15	24	1.40	5.6	+ 0.2	36.8	23	16.6	—35.4	19	7.1	72.2	50.2	2	6.3	23	93.1	4.4	4.27	+ 0.01	29,175	N.W.	132	D.	21	21	5	16	8			
Boston.	29.86	—.10	29.99	30.66	4	29.26	24	1.40	0.4	+ 5.9	29.9	34.4	5.0	17.1	5.6	15.7	60.9	35.0	28	6.3	30	73.1	27.6	0.86	+ 0.42	9,850	E.	48	SW.	14	12	13	11	7			
Block Island.	27.98	—.08	30.00	30.62	4	29.25	24	1.37	31.4	+ 1.0	51.1	24	39.6	1.8	19	23.0	54.3	31.3	18	5.5	30	80.1	6.73	6.98	+ 1.32	13,822	SW.	44	SW.	29	15	11	14	6			
Narragansett Pier.	29.98	—.08	30.00	30.62	4	29.25	24	1.37	28.0	—	53.0	29	36.7	—3.0	19	19.3	56.0	37.0	18	5.5	30	80.1	6.73	6.98	+ 1.32	13,822	SW.	44	SW.	29	15	11	14	6			
New Haven.	29.91	—	30.02	30.65	4	29.35	24	1.30	25.2	—	31.1	24	33.7	—5.4	19	15.9	56.5	35.1	18	4.2	30	77.3	18.9	4.24	+ 0.07	6,728	W.	26	W.	24	13	12	15	4			
New London.	29.92	—	30.59	4	29.27	24	1.32	28.6	+ 0.1	56.4	23	36.3	0.1	19	19.6	58.0	30.3	18	3.9	30	79.7	23.0	4.73	+ 0.33	5,283	SW.	34	SW.	29	14	8	16	8				
Nantucket.	30.00	—	30.63	27	29.34	17	1.28	32.5	—	54.3	26	40.2	5.2	19	24.8	49.1	29.8	19	4.8	84.6	26.3	2.97	+ 0.19	9,175	N.W.	33	n.w.	25	10	12	11	8					
Edgartown.	30.00	—	30.63	27	29.34	17	1.28	30.4	—	52.3	25	39.2	0.3	19	21.6	52.0	30.2	27	7.1	5	19	—	3.20	+ 0.19	19	—	—	—	—	—	—	—	—				
Vineyard Haven.	30.00	—	30.63	27	29.34	17	1.28	32.2	—	56.5	23	41.5	—0.4	19	22.9	56.9	37.1	2	7.1	13	—	4.24	+ 0.17	17	—	—	—	—	—	—	—	—					
Mid. Atlantic States.																																					
Albany.	29.95	—.10	30.04	30.75	4	29.34	17	1.41	20.9	—1.9	50.2	24	31.8	—15.3	19	10.2	65.5	36.6	26	10.1	6	74.7	13.9	3.02	+ 0.18	5,404	S.	33	s.e.	22	13	11	16	4			
New York City.	29.87	—.08	30.04	30.65	4	29.41	17	1.24	30.1	+ 0.4	62.6	23	37.5	6.0	19	22.8	56.6	28.2	23	5.4	30	70.7	21.3	4.19	+ 0.44	6,970	N.W.	32	n.w.	17	11	11	12	8			
Philadelphia.	29.95	—.06	30.07	30.66	3	29.42	17	1.24	31.5	+ 0.2	65.6	23	39.5	8.1	19	23.7	55.9	35.2	28	8.0	19	66.8	21.8	3.23	+ 0.26	8,431	I.W.	41	SW.	24	13	8	15	8			
Atlantic City.	30.00	—.06	30.06	30.64	4	29.42	17	1.22	31.4	+ 0.3	49.4	14	52.8	7.0	19	24.1	52.7	29.6	4.9	30.8	6.6	26.3	3.50	+ 0.44	7,210	SW.	32	SW.	24	9	8	11	22				
Cape Henlopen.	29.97	—.06	30.06	30.66	4	29.45	17	1.20	32.4	+ 0.7	53.2	23	42.8	9.0	3	33.0	54.0	25.2	19	4.8	31	—	1.76	+ 0.68	4,596	N.W.	28	SW.	17	10	7	16	8				
Baltimore.	30.02	—.10	30.06	30.66	4	29.45	17	1.20	32.4	+ 0.7	53.2	23	42.8	9.0	3	25.1	58.5	25.2	19	8.9	56.4	22.5	2.57	+ 0.68	4,596	SW.	28	SW.	17	9	6	14	11				
Washington City.	29.77	—.08	30.07	30.66	4	29.45	17	1.18	32.9	+ 0.2	67.2	23	41.3	6.2	3	23.5	56.1	25.0	12	21	67.9	22.0	2.39	+ 1.12	4,761	S.	28	n.w.	17	9	6	14	11				
Cape Henry.	29.92	—.05	30.07	30.66	4	29.45	17	1.18	32.9	+ 0.2	67.2	23	41.3	6.2	3	23.5	56.1	25.0	12	21	67.9	22.0	2.39	+ 1.12	4,761	SW.	28	n.w.	17	9	6	14	11				
Chincoteague.	30.07	—.06	30.06	30.62	3	29.44	17	1.18	32.5	+ 0.2	69.4	23	42.8	10.0	3	27.5	54.8	22.9	26	7.4	78.3	29.1	3.50	+ 1.29	11,090	N.W.	56	n.w.	17	12	6	15	10				
Lynchburg.	29.83	—.05	30.08	30.65	4	29.62	14	1.03	35.4	+ 0.9	65.4	23	44.8	6.1	4	26.3	51.9	29.2	0.25	6.8	97.0	2.2	2.64	+ 1.83	3,036	SW.	25	W.	17	11	9	13	13				
Norfolk.	30.03	—.05	30.09	30.61	3	29.49	17	1.12	39.4	+ 1.0	69.0	23	48.3	12.6	19	30.1	56.4	32.1	12	4.8	87.7	3.5	3.64	+ 0.33	5,722	S.	29	SW.	20	11	9	15	15				
South Atlantic States.																																					
Charlotte.	29.26	—.02	30.11	30.61	4	29.70	10	0.90	38.2	—2.3	68.9	31	47.2	8.2	4	29.4	60.7	28.1	19	4.9	56.7	3.3	2.39	+ 3.91	3,480	SW.	24	SW.	18	12	5	17	9				
Hatteras.	30.13	—.01	30.12	30.61	3	29.59	27	0.64	1.0	0.90	44.7	+ 1.3	65.6	23	52.1	19	36.8	45.8	28.13	5.9	98.1	9.9	39.3	6.09	3.52	+ 0.58	11,256	S.	41	W.	24	15	9	21	11		
Kitty Hawk.	9	—	—	—	—	—	—	—	41.0	—	0.9	67.7	22	48.6	14.8	19	33.5	51.9	38.3	12.0	4.4	1.9	—	2.55	3.52	+ 0.58	—	—	—	—	—	—	—	—	—	—	—
Raleigh.	29.65	—	30.15	30.64	4	29.03	17	1.01	38.5	—	69.0	23	47.5	8.4	4	29.4	60.6	29.2	28	5.0	57.6	8.8	3.1	3.04	—	S.	29	SW.	18	12	11	11	11				
Smithfield.	34	—	30.15	30.64	4	29.74	17	0.78	43.2	—3.1	64.0	23	51.2	12.0	19	33.5	52.0	34.0	1.1	4.8	30	7.0	3.00	—	0.79	—	—	—	—	—	—	—	—	—	—		
Wash Woods.	30.09	—.02	30.12	30.58	27	29.67	10	0.74	41.9	—	63.4	22	53.4	12.0	19	33.7	54.0	32.0	24	5.0	16	73.6	4.52	4.52	+ 0.57	1.164	N.W.	34	SW.	24	13	6	14	11			
Wilmington.	30.09	—.02	30.12	30.58	27	29.70	13	0.84	44.2	—2.8	73.0	22	53.4	14.6	19	31.1	59.8	27.8	19	4.5	97.3	2.2	30.5	3.52	+ 3.82	8,661	N.W.	32	W.	17	12	6	14	11			
Charleston.	30.12	—.00	30.14	30.46	3	29.71	13	0.75	49.1	—3.4	68.3	23	55.6	20.3	3	41.9	48.0	25.9	19	3.8	29.8	4.4	42.0	3.66	+ 1.89	5,505	N.	28	n.w.	17	11	7	14	10			
Augusta.	29.99	—.01	30.16	30.57	3	29.66	13	0.87	45.2	—2.4	72.0	23	56.6	15.7	3	38.6	56.1	27.1	19	5.9	92.3	3.9	2.34	+ 2.90	5,704	S.	35	SW.	17	10	9	12	10</				

Table of miscellaneous meteorological data for January, 1887—Signal Service observations—Continued.

Stations.	Elevation above sea level.	Atmospheric pressure (in inches and hundredths).								Temperature of the air (in degrees Fahrenheit).												Winds.													
		Extremes.				Temperature of the air (in degrees Fahrenheit).				Extremes.				Daily ranges.				Mean rel. humidity.				Winds.				Maximum velocity.									
		Mean actual barometer.	Departure from normal.	Mean reduced barometer.	Date.	Highest barometer	Lowest barometer	Monthly range of barometer.	Monthly mean.	Departure from normal.	Max.	Date.	Mean max.	Min.	Monthly range.	Greatest.	Least.	Date.	Mean rel. humidity.	Mean dew-point.	Precipitation.	Total movement.	Prevailing direction.	Maximum velocity.	Miles p. h.	Date.	No. of rainy days.	No. of cloudy days.	No. of fair days.	No. of clear days.					
Upper Miss. Valley.																																			
Saint Paul.....	831	29.06	-.09	30.02	30.60	2	29.16	20	1.53	10.7	-11.4	31.5	27	11.7	-35.7	18	-10.2	67.2	47.0	.21	8.7	13	78.8	-4.2	+.76	3,985	n.w.	23	w.	28	8	7	15	9	
La Crosse.....	725	29.21	-.07	30.03	30.55	7	29.09	20	1.56	10.7	-4.7	41.0	27	20.8	-28.9	7	1.2	29.9	37.4	.21	6.0	16	73.3	3.1	-.05	5,966	n.	20	w.	29	6	12	4		
Davenport.....	615	29.33	-.11	30.02	30.64	2	29.23	20	1.41	13.2	-7.7	50.3	22	26.4	-25.6	7	2.8	75.9	38.4	.21	12.0	23	73.2	7.6	1.43	4,030	n.w.	28	sw.	29	11	0	16	9	
Des Moines.....	865	29.08	-.11	30.04	30.73	2	29.19	20	1.44	11.5	-6.4	41.8	29	21.7	-24.5	7	0.0	30.3	34.3	.19	8.3	13	81.7	7.0	0.83	5,778	n.w.	26	n.w.	16	9	6	11	14	
Dubuque.....	665	29.26	-.01	30.01	30.50	2	29.32	20	1.28	10.6	7.5	41.5	29	20.9	-31.5	7	0.4	73.0	36.6	.21	6.5	12	69.0	2.4	3.3	4,744	+	3,090	n.w.	18	10	10	15	10	
Kokonk.....	618	29.35	-.10	30.04	30.71	2	29.27	20	1.44	19.1	-4.4	55.3	22	29.0	-18.5	7	.9	97.8	36.2	.21	6.8	31	78.6	13.2	1.48	2,021	7,434	s.	sw.	28	10	10	15	9	
Cairo.....	359	29.70	-.09	30.08	30.58	3	29.34	13	1.34	33.4	-1.1	60.1	20	41.3	-1.2	1	24.9	77.9	27.7	.21	7.4	22	99.1	22.8	2.15	2,022	7,944	s.	44	20	11	10	15	6	
Springfield.....	644	29.34	-.11	30.04	30.69	2	29.33	13	1.36	23.4	-2.6	61.0	22	34.6	-18.2	2	12.9	79.2	34.8	.21	11.3	14	99.7	14.9	1.09	5,957	n.w.	28	s.	22	7	9	14	8	
Saint Louis.....	571	29.42	-.12	30.04	30.69	2	29.31	13	1.37	30.8	-0.3	65.6	20	41.2	-9.6	2	20.5	75.2	35.0	.20	9.2	31	66.9	19.6	0.65	1.58	9,591	s.	40	w.	13	7	7	13	12
Missouri Valley.																																			
Lamar.....	1,028																																		
Leavenworth.....	842	29.14	-.11	30.05	30.77	2	29.40	20	1.37	20.7	-4.3	60.2	21	31.3	-15.5	9	10.5	75.7	37.0	.15	8.0	5	70.2	11.7	1.27	-.08	5,907	s.	28	w.	20	6	4	16	11
Omaha.....	1,113	29.33	-.10	30.08	30.82	2	29.49	19	1.48	11.8	-7.8	51.1	24	21.9	-21.9	9	4.7	74.3	43.4	.21	9.2	29	51.8	3.2	0.49	6,044	n.w.	32	sw.	16	7	5	14	11	
Valentine.....	2,604	27.16	....	29.98	30.75	2	29.07	19	1.68	15.0	-2.8	49.5	20	2.8	-30.0	9	1.0	79.5	44.2	.21	12.1	25	70.8	8.5	0.29	9,053	s.w.	44	sw.	11	10	15	18	11	
Huron.....	1,307	28.57	-.13	30.05	30.88	2	29.14	19	1.81	-0.4	-7.1	38.5	20	12.9	-42.8	8	-12.8	81.3	46.8	.21	11.8	17	79.9	6.2	0.3	5,393	n.w.	30	sw.	20	8	4	20	7	
Yankton.....	1,234	28.64	-.13	30.03	30.90	2	29.14	19	0.66	7.8	-6.2	47.4	20	20.0	-29.1	8	3.7	70.5	14.3	.20	5.3	13	73.0	1.1	0.43	5,402	n.w.	38	sw.	20	8	4	14	13	
Northern slope.																																			
Fort Assinabine.....	2,690	26.98	-.23	29.94	30.69	5	29.20	12	1.49	9.3	-0.2	43.2	14	20.4	-35.0	6	5.9	78.2	51.0	.22	10.8	9	64.6	-0.3	1.17	0.07	9,206	sw.	56	w.	14	6	9	19	3
Fort Custer.....	3,040	26.67	-.15	29.94	30.58	2	28.96	19	1.72	10.5	-2.1	40.7	14	27.2	-30.8	9	4.7	70.5	51.5	.21	5.9	20.9	80.3	12.6	1.31	4,121	sw.	38	n.	24	11	13	9	6	
Fort Maginnis.....	4,320	25.28	....	29.81	30.54	5	29.09	19	1.45	18.5	-3.0	47.3	14	28.3	-26.5	31	8.3	73.8	45.4	.21	12.0	29.9	9.7	2.77	1.21	12,407	n.w.	24	w.	11	10	15	13	3	
Helena.....	4,050	25.62	-.25	29.9	30.50	17	29.16	19	1.31	20.6	-5.4	47.9	14	30.9	-25.3	31	10.9	73.2	24.5	.21	10.0	73.3	13.4	1.35	0.3	6,973	sw.	40	w.	12	17	15	13	3	
Poplar River.....	2,930																																		
Deadwood.....	4,600	25.13	-.15	29.93	30.61	5	29.18	19	1.43	20.2	-0.8	45.0	19	29.0	-18.2	31	11.2	63.2	23.6	.21	7.0	1	79.0	14.8	3.18	2.14	4,726	sw.	34	sw.	19	18	4	12	15
Cheyenne.....	6,105																																		
North Platte.....	2,841	26.97	-.13	30.02	30.70	2	29.29	19	1.41	18.9	-0.6	56.0	27	31.1	-21.4	8	8.2	77.4	47.3	.21	6.4	21	78.6	13.0	0.15	0.37	5,791	w.	40	w.	29	4	0	16	15
Middle slope.																																			
Denver.....	5,294	24.57	-.13	29.91	30.55	17	29.24	19	1.31	31.3	+.4.1	66.9	19	44.1	-17.6	8	17.4	84.4	52.8	.21	13.9	29	54.8	14.5	0.67	+.03	8,289	s.	56	n.w.	28	8	0	1	13
Pike's Peak.....	14,134	17.41	....	30.02	30.79	17	29.47	20	1.33	0	-2.3	19.0	9	5.8	-10.7	9	6.0	39.7	21.1	.22	4.3	7.83	3.3	3.6	0.7	1.00	28,058	n.w.	98	n.	13	15	17	13	11
Lake Animas.....	3,809	15.93	-.15	29.97	30.65	17	29.29	19	1.36	27.7	+.8.1	75.6	19	45.5	-18.0	9	10.3	13.8	55.6	.21	18.7	17.4	77.1	17.6	0.13	5,928	w.	42	sw.	20	4	2	18	11	
Concordia.....	1,384																																		
Dodge City.....	2,523	27.16	-.11	30.04	30.75	2	29.45	19	0.30	27.1	+.2.0	72.9	19	41.2	-17.0	9	13.3	80.9	48.7	.21	19.0	15.6	62.0	14.7	0.07	0.31	7,288	sw.	37	sw.	16	4	0	13	18
Fort Reno.....																																			
Fort Supply.....																																			
Fort Elliott.....	2,700	27.19	-.12	29.95	30.60	2	29.41	12	1.18	34.1	+.3.9	73.4	21	50.5	-4.4	8	20.0	77.8	44.9	.21	12.0	8	58.7	19.4	0.01	0.34	9,272	n.w.	41	sw.	6	1	0	12	19
Southern slope.																																			
Fort Sill.....	1,200	28.80	-.08	30.06	30.75	2	29.52	12	1.23	37.4	+.2.6	75.9	16	51.2	0.2	8	24.5	75.7	41.2	.21	10.9	24.9	7	16.7	0.00	1.08	9,893</								

*Meteorological record of voluntary observers and Army post surgeons, January, 1887.*

The maximum and minimum temperatures at stations marked thus (\*) are from readings of other than standard instruments.

Stations.	Temperature.			Rainfall.	Temperature.			Rainfall.
	Maximum.	Minimum.	Mean.		Stations.	Maximum.	Minimum.	
Alabama.	70	60	60	Inches	Iowa.	60	60	Inches
Greeusborough	72	12	45.0	3.32	Bancroft	35	-27	2.0
Livingston	76	10	45.0	3.22	Cedar Rapids	40	-24	9.5
Mount Vernon Bks.	75	14	48.1	4.49	Cedar Rapids b.	40	-32	8.8
Arizona.					Cresco	33	-32	3.0
Lowell	82	18	49.5	0.00	Des Moines	50	-34	9.8
McDowell	79	18	49.4	0.00	Humboldt	42	-28	5.2
Arkansas.					Independence *	35	-24	7.9
Lead Hill.	75	-7	34.3	1.33	Logan	46	-26	10.9
California.					Madison, Fort	54	-21	0.90
Anderson	76	28	49.3	1.41	Monticello *	43	-32	8.9
Alcatraz Island	66	41	50.7	1.40	Mount Vernon	45	-26	9.0
Angel Island	75	36	51.9	1.96	Muscatine	45	-30	12.5
Benicia Barracks	66	36	49.7	1.12	Oskaloosa a *	40	-27	10.3
Bedwell, Fort.	53	8	34.1	2.57	Oskaloosa b *	42	-24	
Gabuonga Valley					Kansas.			
College City	70	30	50.0	0.26	Allison	62	-23	26.2
Gaston, Fort.					Belleville	54	-10	26.4
Mason, Fort.	64	41	51.7	0.86	Blue Rapids *	53	-18	2.8
Nicolaus	71	30	48.3	1.12	El Dorado	69	-21	0.28
Oakland*	66	35	49.4	1.57	Globe	60	-24	22.0
Oroville	70	32	50.8	1.02	Hays, Fort	75	-28	33.0
Prestidio of San F	68	37	51.2	1.26	Independence	68	-18	27.1
Princeton	69	22	48.7	0.47	Manhattan a	55	-24	19.6
Riverside*	78	26	51.4	0.13	Manhattan b	62	-23	22.2
Sacramento	65	26	44.3	1.07	Minnescah	72	-20	26.0
Salinas	70	28	46.8	0.75	Ottawa	67	-22	21.7
Santa Barbara	79	37	54.7	0.31	Tiley, Fort	58	-25	21.7
Santa Maria	80	30	54.0	0.50	Sallins	43	-11	26.0
Colorado.					Wakefield	64	-16	23.7
Collins, Fort.	79	-13	26.9	0.86	Wellington	63	-20	20.7
Lewis, Fort.	47	-5	24.5	0.15	West Leavenworth	54	-6	0.48
Connecticut.					Wyandotte	59	-20	21.4
Bethel					Kentucky.			
North Colebrook	49	-16	18.1	2.86	Richmond	67	-5	31.5
Voluntown	60	-5	.....	7.00	Louisiana.			4.30
Dakota.					Grand Coteau	75	17	50.3
Abr. Lincoln, Fort.	36	-48	8.6	1.18	Liberty Hill			2.57
Henry					Maine.			2.52
Meade, Fort.	49	-33	17.4	0.23	Cornish *	48	-17	16.3
Pembina, Fort.	22	-45	13.4	0.50	Gardiner	45	-23	15.8
Bandall, Fort.	51	-33	10.0	0.24	Keat's Hill	43	-19	12.8
Richardton	32	-38	2.7	2.00	Orono *	44	-29	14.0
Sisseton, Fort.	32	-40	5.5	0.40	Maryland.			
Sully, Fort.	40	-30	3.0	0.25	Cumberland	60	-6	28.6
Totten, Fort.	32	-31	9.9	0.91	Falston *	58	1	2.72
Webster	34	-44	12.6	4.55	Great Falls	60	2	31.9
Yates, Fort.	29	-50	2.4	0.86	McDonogh	62	2	30.2
District of Columbia.					McHenry, Fort	53	8	31.1
Distributing reserv'r	66	7	32.7	3.80	New Midway *	66	2	32.0
Receiving reserv'r					Woodstock	63	1	30.0
Rock Creek.	68	9	35.9	.....	Massachusetts.			0.49
Florida.					Anherst a	47	-22	19.4
Archer	71	23	48.9	3.52	Anherst b	48	-12	21.9
Alva *	84	31	57.9	1.10	Blue Hill Obs'y	52	-11	5.19
Duke	75	25	51.4	1.25	Deerfield	50	-24	19.5
Meade, Fort.	52	27	.....	Dudley	50	-11	23.0	
Limona *	82	28	57.5	2.07	Fall River	55	3	25.7
Manatoe	84	31	58.1	2.40	Heath	56	-12	7.38
Merritt's Island	80	35	58.6	2.43	Milton	59	-13	20.1
Tallahassee	76	21	.....	North Bedford	52	5	26.7	
Georgia.					North Truro			4.14
Forsyth	72	14	43.5	3.95	Somerset *	59	8	25.5
Milledgeville	73	12	41.0	3.73	Taunton	58	7	25.1
Quitman *	74	19	47.1	3.50	Westborough	56	-22	27.1
Idaho.					Willistown	57	-17	20.0
Bolsé Barracks	52	14	36.0	2.42	Worcester	49	7	21.1
Cœur d'Alene, Fort.	46	12	32.5	4.08	Michigan.			
Lewiston	60	29	.....	Birmingham	49	-17	1.54	
Illinois.					Brady, Fort	39	-29	6.4
Bloomington	55	-18	.....	East Saginaw	45	-13	19.5	
Collinsville	60	-18	23.9	0.10	Harriville *	45	-17	4.89
Charleston *	62	-20	23.0	1.02	Hudson *	53	-23	1.05
Jacksonville	62	-20	19.9	0.89	Kalamazoo	45	-9	27.0
Mattoon *	65	-21	24.0	1.30	Lanning	48	20	18.3
Pekin *	53	-27	17.0	2.16	Muttville	55	-26	1.03
Peoria *	56	-21	21.0	1.10	Swartz Creek	53	-25	17.3
Riley	42	-25	11.1	3.59	Thornville *	52	-22	19.2
Rockford	40	-30	12.7	4.21	Traverse City	39	15	4.06
Sandwich	46	-26	15.2	4.59	Minnesota.			
South Evanston	46	-22	.....	Minneapolis	23	-34	0.2	
Sycamore	43	-24	12.5	3.93	Snelling, Fort	32	-42	0.83
Windsor	60	-19	21.8	1.49	Missouri.			
Indiana.					Central College *	60	-16	1.10
Gibson, Fort.	73	-19	34.9	0.41	Centreville	66	-15	1.98
Reno, Fort.	73	-9	34.8	0.00	Conception	47	-24	11.9
Supply, Fort.	75	-23	30.4	0.00	Springfield *	50	-11	34.5
Butlerville *	66	-13	24.0	3.38	Montana.			
Fort Wayne*	60	-14	24.0	1.29	Keogh, Fort	49	-50	8.6
Jeffersonville	62	-15	31.6	3.73	Missoula, Fort	42	-9	25.6
Laconia	63	-6	29.0	3.00	Shaw, Fort.	43	-34	18.6
Lafayette	62	-13	20.1	1.18	Nebraska.			
Le Grange	54	-16	19.0	0.80	Brownville *	50	20	16.8
Logansport*	64	-27	22.4	2.85	Orte			0.03
Manzy	60	-17	21.2	2.02	Do Soto *	63	-23	10.8
Sumner*	60	-13	26.1	3.13	Fairbury *	56	-20	29.8
Vevay	64	7	30.4	4.18	Fremont *	50	-22	0.73
Indiana.					Genoa	46	-27	10.9
					Hay Springs *	50	-23	17.1

*Meteorological record of voluntary observers, etc.—Continued.*

Stations.	Temperature.			Rainfall.	Stations.	Temperature.		
	Maximum.	Minimum.	Mean.			Maximum.	Minimum.	Mean.
Nebraska—Cont'd.	0	0	0	Inches	Oregon.	0	0	0
Lincoln.....	55	-22	14.7	0.15	Albany*.....	56	30	43.8
Marquette.....				0.15	East Portland*.....	47	30	.....
Niobrara, Fort.....	51	-30	14.6	1.00	Kodi*.....	54	23	41.0
Robinson, Fort.....	54	-25	21.2	1.11	Klamath, Fort.....	54	1	30.7
Sidney, Fort.....	61	-17	23.4	0.12	La Grande.....	45	14	5.18
Stockmen.....				0.25	Mount Angel.....	24	27	43.0
Tecumseh.....	49	-18	17.8	0.75	Pennsylvania.			15.36
Yutan.....	40	-22	11.3	0.35	Altoona.....	62	1	33.1
Vermont.					Blooming Grove*.....	52	14	3.50
Carson City.....	61	8	36.5	1.10	Catawissa*.....	58	13	2.68
McDermitt, Fort.....	49	9	31.1	0.53	Duberry.....	49	18	4.00
New Hampshire.					Easton.....			5.01
Antrim*.....	43	-20	5.82		Fallington*.....	61	3	27.3
Ashland.....			4.23		Franklin*.....	44	-12	21.1
Belmont.....			4.19		Grapem Hill*.....	54	12	22.1
Berlin Mills.....	56	-33	3.66		Mendville*.....	58	5	25.0
Bristol.....			3.56		Phillipsburg*.....	59	-12	21.8
Lake Village.....			3.54		Quakertown*.....	55	1	27.6
Nashua.....	53	-25	19.9	5.43	State College.....	58	7	21.6
Wier's Bridge.....			3.48		Wellsborough*.....	45	-14	21.2
Wolfborough.....			5.19		West Chester.....	62	2	28.1
Woodstock.....			6.90		Wysox.....	57	-10	23.5
New Jersey.					Zionsville*.....	54	5	5.58
Beverly.....	63	40	28.9	2.30	South Carolina.			
Clayton*.....	67	5	29.1	2.79	Aiken.....	72	16	43.9
Dover.....	66	-4	24.7	6.21	Kirkwood*.....	67	12	39.8
Lakewood.....	67	8	37.5	.....	Paoclet*.....	66	8	30.5
Moorestown.....	65	2	28.4	2.92	Spartanburg*.....	46	31	37.3
Paterson.....	60	4	28.8	3.96	Stateburg*.....	71	12	42.4
Readington.....	68	6	31.6	.....	Tennessee.			
Roseland.....	58	-4	24.7	4.84	Ashwood.....	68	3	35.5
Salem.....	63	4	32.2	.....	Austin*.....	71	2	38.8
South Orange.....	60	8	28.7	3.50	Millan.....	70	1	37.3
Upper Montclair.....	55			2.96	Texas.			
New Mexico.					Austin*.....	81	17	48.8
Bayard, Fort.....	76	17	43.9	0.08	Clubsorne.....	82	0	0.43
Gallinas Spring.....	59	3	.....	0.75	Comfort.....			0.00
Solden, Fort.....	73	11	43.1	0.10	Corsicana.....			0.14
Union, Fort.....	69	-10	32.2	0.45	Dallas*.....	80	6	47.2
Wingate, Fort.....	51	3	31.4	0.52	Molntosh, Fort.....	84	18	53.4
New York.					Midland*.....	79	18	41.7
Auburn.....	53	-2	23.1	3.05	New Ulm.....	81	10	49.6
Brooklyn.....	61	5	31.3	2.46	Ringold, Fort.....	93	23	58.4
Columbus, Fort.....	50	-5	26.7	4.53	Silver Falls.....	78	-5	trace
Cooperstown*.....	51	-18	18.0	3.23	Vermont.			
Factoryville*.....	55	-12	22.7	1.20	Brattleborough.....	46	-22	18.5
Humphrey.....	52	5	20.1	4.06	Burlington.....	49	-17	18.1
Ithaca.....	56	-12	22.9	1.55	Charlotte.....	50	-17	14.2
Le Roy.....	59	-8	21.2	2.52	Lunenburg.....	49	-25	13.3
Madison Barracks.....	50	-36	14.7	2.80	Newport.....	41	-30	11.1
Menard.....	46	-14	19.6	2.97	Post Mills*.....	44	-42	8.1
Niagara, Fort.....	48	-4	23.0	0.64	Poutney.....	44	-26	15.5
North Volney*.....	49	-14	19.0	.....	Stratford.....	42	-24	12.9
Palermo.....	44	-18	17.0	5.39	Virginia.			
Palmyra*.....	47	-7	.....	0.97	Bird's Nest*.....	70	13	38.9
Penn Yan.....					Bruington*.....	65	10	.....
Setauket.....	57	4	29.2	5.33	Dale Enterprise*.....	63	0	33.6
Utica.....	47	-20	.....	.....	Marion.....	66	3	32.5
West Point.....	54	-7	24.5	4.40	Monroe, Fort.....	65	12	38.3
White Plains.....	50	-4	26.2	4.38	Rappahannock.....	69	-2	30.7
North Carolina.					Snowville.....	65	2	.....
Chapel Hill.....	72	8	39.1	2.81	Summit.....	68	2	32.1
Flat Rock.....	61	3	33.3	4.38	University of Va.....	61	17	39.0
Lenoir.....	62	3	.....	Varlety Mills.....	65	1	34.9	
Lincolnton.....	63	1	32.7	4.60	Wytheville.....	62	6	33.5
Raleigh.....	74	6	41.0	2.65	Washington Territory.			
Reidsville.....	78	1	28.2	.....	Bainbridge Island*.....	52	30	42.5
Statesville*.....	65	6	35.7	2.36	Keoweeck.....	58	14	3.51
Wake Forest.....	71	7	39.8	3.01	Spokane, Fort.....	52	3	29.3
Weldon*.....	70	10	38.8	3.47	Tacoma*.....	50	28	39.8
Ohio.					Townsend, Fort.....	54	18	41.2
Cleveland.....	62	-6	25.7	2.21	Walla Walla, Fort.....	56	21	41.5
College Hill*.....	70	-16	34.2	3.00	West Virginia.			
Elyria.....	62	-15	32.7	2.38	Clarkesburg.....	61	-8	29.4
Garrisonville.....	61	-18	22.5	1.73	Helvetia*.....	68	-6	31.0
Hiram.....	62	-8	22.0	1.83	Middlebrook.....	58	-6	25.6
Jacksonborough*.....	60	-12	24.6	1.85	Parkersburg.....	66	-3	30.9
Napoleon.....	60	-11	24.2	1.85	Wisconsin.			
North Lewisburg.....	64	-10	23.2	3.05	Delavan.....	40	-27	11.6
Portsmouth.....	65	4	33.0	2.84	Embarres.....	44	-36	2.0
Ruggles*.....	56	-8	23.2	1.90	Fond du Lac*.....	41	-42	8.9
Tiffin a*.....	59	-8	23.7	1.75	Madison.....	39	-29	10.0
Tiffin b.....	60	-11	21.2	1.67	Manitowoc.....	37	-18	13.8
Wauseon.....	59	-20	19.3	2.36	Waupau.....	35	-36	5.0
Westoverly.....	62	-10	27.4	1.81	Wyoming.			
West Milton*.....	65	-13	26.7	3.50	Camp Sheridan.....	40	-21	18.3
Yellow Springs.....	60	-9	26.2	2.40	Laramie, Fort.....	59	-14	24.4
					Washakie, Fort.....	47	-25	22.0

carried away; at Bluffton, in the same county, the Toledo, Saint Louis, and Kansas City Railroad bridge was partially destroyed.

Chattanooga, Tennessee: an unusually heavy rain set in at 10.35 a. m. of the 23d and continued for five hours, 3.34 inches falling in that time, flooding the lower part of the town to the depth of four feet, and doing considerable damage to cellars and the first floors of dwellings.

Rynd Farm, Venango county, Pennsylvania: on the 24th an ice gorge, two miles long, formed in Oil Creek, causing the water to rise rapidly and submerge all the low land in the vicinity.

Machias, Washington county, Maine: on the 28th and 29th very heavy rain fell, melting the snow that covered the ground to a depth of twenty inches, and causing an extensive flood.

Portland, Oregon: the total rainfall of this station for the month was 12.31 inches; on the 23d 2.50 inches fell in sixteen hours. From 10 a. m. to 4 p. m. of that date the rainfall was unusually heavy, causing Tanner Creek, a small stream flowing through the western portion of the city, to overflow its banks and carry away wooden sidewalks, fences, and numerous small shanties occupied by Chinese; one person was drowned.

#### ATMOSPHERIC ELECTRICITY.

##### AURORAS.

Saint Vincent, Minnesota: at 9.50 p. m. of the 18th an auroral light was observed faintly tinging the northern sky. As the night advanced the display increased in magnitude and brilliancy, illuminating at midnight the whole of the northern sky; at times broad, reddish colored streamers would ascend rapidly toward the zenith. The light was most brilliant at 12.18 a. m. of the 19th, after which it began to fade. The observer at this place states that at 11.20 p. m. of the 24th the indications of an electrical disturbance were manifested by a humming noise made by the telegraph wire running into the office and the imperfect working of the telegraph instruments. Shortly after, an auroral light became visible above the northern horizon; the display increased in magnitude and assumed the form of a bright red arch resting upon a dark base, altitude 15°. The aurora remained in this position until 12.10 a. m. of the 25th, when a second arch began forming under the first; at about 1 a. m. the two arches blended into a diffuse pink light. The display ended at 2 a. m.

Lyons, Wayne county, New York: a diffuse auroral light was visible between 10 p. m. and midnight of the 22d.

Auroral displays were also observed at the following places: 7th.—Albany, New York.

14th and 15th.—Dudley, Massachusetts; Escanaba, Michigan. 16th.—Fort Totten, Dakota; Gardiner, Maine; Wellsborough, Pennsylvania.

17th.—Fort Totten, Dakota.

18th.—Kent's Hill and Gardiner, Maine.

20th—Wellsborough, Pennsylvania.

22d.—Fort Buford and Webster, Dakota; Duluth and Moorhead, Minnesota.

23d.—Bismarck, Dakota.

24th.—Pekin, Illinois.

25th.—Fort Totten and Fort Buford, Dakota.

26th and 29th.—Pekin, Illinois.

##### THUNDER-STORMS.

Thunder-storms are reported to have occurred in the various states and territories during the month, as follows:

*Alabama*.—Montgomery, 13th, 23d; Livingston, 13th, 29th; Mobile, 23d.

*Arkansas*.—Little Rock and Lead Hill, 22d.

*Florida*.—Merritt's Island, 1st, 13th, 14th; Key West, 7th; Limona, 13th; Archer, 13th, 14th, 23d; Duke and Sanford, 14th; Cedar Keys and Pensacola, 23d.

*Georgia*.—Quitman, 12th, 14th, 23d; Savannah, 13th; Millidgeville, 13th, 23d; Atlanta and Forsyth, 23d.

*Illinois*.—Chicago, Collinsville, Manhattan, Pekin, and Peoria, 22d.

*Indiana*.—Butlerville, Laconia, Sunman, and Vevay, 13th.

*Iowa*.—Dubuque, Monticello, and Cedar Rapids *a*, 21st, 22d; Cedar Rapids *b*, Fort Madison, Independence, and Oskaloosa, 22d.

*Kansas*.—Allison, 19th; Independence and Wellington, 22d.

*Kentucky*.—Louisville, 13th.

*Louisiana*.—Grand Coteau, 22d, 23d, 28th, 29th; Shreveport, 22d, 28th; New Orleans, 23d.

*Massachusetts*.—Blue Hill Observatory, Cambridge, and Milton, 24th; Fall River, 26th.

*Michigan*.—Kalamazoo and Mottville, 22d.

*Minnesota*.—Saint Vincent, 10th.

*Mississippi*.—Vicksburg, 22d, 23d, 28th.

*Missouri*.—Centreville, Central College, and Conception, 22d.

*North Carolina*.—Kitty Hawk and Hatteras, 13th; Smithville and West Point, 14th; Flat Rock, 23d.

*Ohio*.—College Hill, Jacksonborough, West Milton, and Yellow Springs, 13th.

*Oregon*.—Mount Angel, 15th.

*South Carolina*.—Charleston, 13th, 29th; Spartanburg, 23d.

*Tennessee*.—Austin and Chattanooga, 13th; Milan, 13th, 22d, 28th; Nashville, 13th, 23d; Knoxville, 23d, 24th; Ashwood, 13th, 28th.

*Texas*.—Cleburne, Dallas, and New Ulm, 22d.

*Wisconsin*.—Delavan, Fond du Lac, Madison, and Manitowoc, 21st.

##### ELECTROMETER READINGS.

Observations of the electrical potential of the atmosphere have been continued during the month of January, 1887, as usual. At Washington City, in a series of simultaneous observations at the top of the Washington Monument and at the Signal Office on January 28th, the following values were obtained:

Time.	Monument.	Signal Office.	Difference.	Time.	Monument.	Signal Office.	Difference.	Remarks.
	Volts.	Volts.	Volts.		Volts.	Volts.	Volts.	
1 p. m.....	375	162	213	2 p. m.....	450	150	300	Wind, wsw.; sky about nine-tenths covered with cirro-stratus clouds. At the Monument, wind blowing strongly on the collector. A very feeble spark could be obtained after 2 p. m. on "grounding" the needle.
1.05 p. m.....	225	144	81	2.05 p. m.....	500	138	362	
1.10 p. m.....	300	132	168	2.10 p. m.....	500	144	456	
1.15 p. m.....	300	126	174	2.15 p. m.....	500	126	374	
1.20 p. m.....	350	126	124	2.20 p. m.....	375	132	243	
1.25 p. m.....	300	132	168	2.25 p. m.....	325	96	229	
1.30 p. m.....	425	138	287	2.30 p. m.....	450	96	354	
1.35 p. m.....	250	132	118	2.35 p. m.....	500	102	398	
1.40 p. m.....	375	138	237	2.40 p. m.....	500	120	386	
1.45 p. m.....	425	132	293	2.45 p. m.....	500	152	338	
1.50 p. m.....	375	156	219	2.50 p. m.....	500	180	320	
1.55 p. m.....	375	156	219	2.55 p. m.....	500	186	314	
				3 p. m.....	500	192	308	

In the regular series of observations, negative values were obtained at 9 and 11 a. m. on the 10th, during clear weather with brisk northwesterly winds, and do not appear to be reconcilable with any noted change in the weather; on the 17th, preceding and during rain; on the 24th, during rain and during the commencement of snow; on the 26th, small values, during light rain; and on the 29th, during rain. Snow was generally accompanied by positive values.

At Baltimore, Maryland, a continuous photographic record has been obtained, and the following notes are abstracted from the observer's report: "There have been, during the month, four electrical storms. The first began with a rapidly increasing positive potential at 7 p. m. on December 31st, which became normal at 9 a. m. of January 1st. Fluctuations, rapidly alternating in sign, and in magnitude far beyond 1,000 volts, occurred until 12.30 a. m., followed by smaller oscillations until 3.30 a. m., from which time until 6.30 a. m. the curve is normal. A sudden fall to a negative value of 900 volts then occurs, and the potential remains negative until 9 a. m. Snow began at 1.30 p. m. on December 30th, changing to rain, which ended at 9.15 a. m. January 1st. The second disturbance began, with a sharply falling potential, at 7 p. m. on January 13th, and ended at 5.30 a. m. of the 14th. The most violent fluctuations occurred from midnight until 1.30 a. m. Rain began at 6.55 p. m. on the 13th and ended on the a. m. of the 14th. The third period of disturbance was preceded by a slowly falling potential from noon of the 16th until noon of the 17th, when occurred a sudden drop to a negative value of 800 volts, followed by slow fluctuations until 5 p. m., when the curve became normal. Rain began at 10.55 a. m. and ended at 4.10 p. m. of the 17th instant. The fourth, a storm of great violence,